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ANTHROPOMETRY OF THE COMANCHES[1]

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ONE TEXT FIGURE AND THREE PLATES

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[161] The Comanches, numbering some 1956 individuals,[2] at present reside on and near a government reservation in south-central Oklahoma, for the most part leading a sedentary, half-hearted agricultural existence. They were in immediate pre-reservation times a true and the southermost plains tribe,[3] noted as daring and ruthless raiders, who followed and lived largely on the buffalo, their nomadic and depredatory range extending from the Platte River in Wyoming and Nebraska to Durango in central Mexico. As early as 1717 and probably earlier, Comanche encampments were to be found in New Mexico and western Texas (Chaves, '06). Mooney (1898), however, considered them on the bases of language and traditions a "comparatively recent offshoot from the Shoshoni of Wyoming" (p. 161).

144 Admixture of blood, especially with Mexicans, as well as with Indians of other tribes and some whites has taken place certainly since early historical times, and continues to the present day. Mixture with the negro seems to have been very rare throughout their history; in the present population only one Comanche with even suspected negro blood was noted. Mooney, as early as 1896, was impressed by the extent of blood mixture among the Comanches, feeling that "at least

[1] Grateful acknowledgment is extended to the American Association for the Advancement of Science for a grant-in-aid which made possible the securing of the data here reported.

[2] Rept. Comm. Indian Affairs, Washington, 1932, p. 45.

[3] Wissler, C., N. A. Indians of the Plains. N. Y., 1927, p. 13.

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144 one-quarter of the whole number have more or less of captive blood" (1898, p. 235). In 1927 Wissler tabulated 62.9 per cent of the Comanches as full-blood. It is the opinion of the writer that at present (1931) at most 10 per cent of the adults can with any assurance be considered full-blood. The Comanches themselves fully realize their almost total miscegenation.

619 631 The tribe had been subdivided into bands, the more important being Penateka, Yapa, Kwahadi, Kotsoteka, and Tanema. The first two in particular wandered south into Texas in early times, the other groups remaining north about the Arkansas River in Kansas. In the present investigation measurements were obtained on members of each of the mentioned bands, as well as on a few individuals of the Noyika band. The latter name apparently does not appear in the literature. However, Dr. Ralph Linton, of the University of Wisconsin, who recently did ethnological work among the Comanches, was kind enough to inform the writer that he too came across members of a Noyika division; he also remarks on the almost total elimination of the full-blood. The writer has not attempted to make anthropometric comparison between the various bands because of the totally inadequate numbers. Moreover, intermarriage appears to have been always indiscriminate with respect to band. At present distinction as to band seems largely lost, only the older people apparently remembering their old band affiliations.

ANTHROPOLOGICAL OBSERVATIONS

114 Although the Comanches have always been fairly numerous (7000 in 1690)[4] and an important factor in the history of the southern plains and Texas, little is reported on them ethnologically[5] and even less physically. Catlin (1842, p. 66)

[4] Mooney, J., The aboriginal population of America north of Mexico. Smiths. Misc. Coll., LXXX, no. 7, p. 13, 1928.

[5] For the linguistic classification and the history of the Comanches, see, in addition, Clark, W. P. (1885, article Comanche); Bur. Am. Ethnol. Bull. 30, ('07, '10, articles Comanche and Shoshonean); Kroeber ('06–'07, p. 97). For fuller titles see bibliography.

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speaks of the 'Comances' as "in stature rather low, and in person often approaching to corpulency." Richardson (1829, p. 61) quotes Marcy's description of the Comanches in 1854 as men "about medium stature, with bright copper-colored complexions and intelligent countenances, in many instances with aquiline nose, thin lips, black eyes and hair, with but little beard." Finally, Boas (1895) reports stature for seventy-four and cephalic index for twenty-nine Comanche males measured by his students at the Chicago Columbian Exposition of 1893. Except for additional casual statements about their appearance, nothing else on the physical status of the Comanches, to the writer's knowledge, has appeared in print.

PRESENT STUDY

The present study comprises thirty-five full- and probably full-blood males, twenty-five full-blood females, and twenty-five mixed bloods. The numbers are regrettably small, but mixture of blood is so prevalent that little better was possible under the circumstances. Virtually every town and surrounding environs where Comanches lived—Lawton, Cache, Fletcher, Walters, Mt. Scott—was visited in the search for full-bloods. By full-blood the writer means a person with no other blood than that of his tribe as far back as he can remember, and as far as other, older, members of the tribe recall; this criterion must agree with the physical diagnosis based on character of hair, color of eyes and hair, Hrdlička's skin reaction, pigmentation, general appearance, etc. All reasonable precautions were taken in the present study to insure accuracy of judgment.

The number of virtually certain full-bloods, nineteen males and twenty-five females, although small, is believed to be a typical group. Data are therefore given in some detail, more so since the full-blood is rapidly becoming totally eliminated and other information is meager.

A number of the subjects examined appeared full-blood, yet for one reason or another, the diagnosis could not be as certain as desirable. These subjects were designated as 'prob-

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123 able[1] full-bloods. They appear more divergent metrically
124 than either full- or mixed-bloods, and are therefore treated separately.

The data for the mixed-bloods will not be given in detail, inasmuch as the group is made up about equally of Mexican, other Indian, and white admixture, no one sub-group being large enough to give a reliable sample. Mixed-bloods were measured incidentally, all time and effort being exerted in mustering full-bloods. It may be mentioned, however, that, in general, the mixed-bloods, especially the Mexican-Comanches, resembled the full-bloods to a remarkable degree, so much so that not infrequently it was quite difficult to distinguish one from the other. Exactly this same situation was commented upon long ago by Fitzpatrick, as quoted by Mooney.[6]

There have been suggestions, even positive assertions, that the Comanches were physically as well as linguistically related to the Shoshoni.[7] The Comanches have been compared, therefore, with the latter in as great detail as the available Shoshoni material allowed. The Apache (San Carlos), Dakota Sioux, Indians of the Southwest and Mexico, and Old U. S. Whites, have also been more or less utilized for comparative purposes because of similarity to, or to show in sharper relief, the Comanche characters.

124 Measurements were taken with tested, standard instruments, and the methods followed are those endorsed by the
000 International Agreement.[8] The writer is deeply indebted to Drs. Aleš Hrdlička, of the U. S. National Museum, and Truman Michelson, of the Bureau of American Ethnology, for their instructions in method and invaluable advice throughout

[6] Loc. cit., p. 174.

[7] "Physically, the Comanche retain something of the heavy featured face of the true Shoshone . . . ." (Farrand, '04, p. 144).

". . . . it is highly probable that if the fact could be ascertained, which I have no doubt a thorough research would establish, it would be shown that the Shoshoneans, Comanches, and Utes were formerly one and the same people—a conclusion based upon the similarity of their language—and physical characteristics." (Clark, 1885, p. 119.)

[8] Hrdlička (A.), Anthropometry. The Wistar Institute, Philadelphia, 1920.

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this study. To Dr. Franz Boas the writer is grateful and wishes to express his thanks here for the opportunity of examining old Comanche data.

AGE

The age distribution of the subjects examined is given below. A disproportionate number of the male full-bloods are in the higher age brackets due to the almost hopeless task of distinguishing full-bloods among the young. As a rule, however, the old men were remarkably well preserved; wherever there was a chance of a physical ailment or decrepitude influencing a measurement or observation, a notation to that effect was made or the item was altogether omitted.

Age distribution

YEARS	FULL-BLOOD		PROBABLE FULL-BLOOD
	Male	Female	Male
	Per cent	*Per cent*	*Per cent*
21 to 30	5.3	4.–	12.5
31 to 40	5.3	16.–	12.5
41 to 50	31.6	24.–	18.8
51 to 60	15.8	36.–	50.–
61 to 70	26.3	20.–	6.2
71 to 80	15.8		
Average	56.8y.	52.–y.	48.4y.
Minimum	26	28	25
Maximum	80[1]	70	61

[1] One man, head measurements only.

DESCRIPTIVE OBSERVATIONS[2]

Color of skin. The most common color of the skin in both sexes was medium- to reddish-brown on the face, and light-brown on the unexposed medial surface of the upper arm. The skin of the females, in general, appeared somewhat lighter in both regions. There was practically no difference between the full- and probable full-bloods.

[2] In the following, the term Comanche and all observations and measurements will refer to the full-bloods only, unless otherwise stated.

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147 *Skin-reaction.* The "reaction of the skin on the chest to the irritation caused by drawing over it a finger-nail with force"[10] was used as an adjunct in distinguishing full- from mixed-bloods. In healthy full-bloods the hyperaemia which constitutes the reaction was often slight, never over medium. At times the hyperaemia did not appear for about a minute after the initial irritation.

142 *Color of eyes.* The predominating eye color in both sexes was a medium brown. Doctor Hrdlička mentions a "moderate [145] dilution or loss of color with age" among the Sioux;[11] this occurs in the Comanche as well. The eyes of the children were generally a richer, deeper brown.

The color of the sclera in the adults was most frequently a dull- or yellowish-white, usually more or less bloodshot. The pigmentation may have been affected by the widespread trachoma.

Eye slant. In one-third of the males and nearly one-half of the females, the eyeslits were practically horizontal. Most of the remaining subjects had their outer canthi inclined upward (slightly to moderately), a few cases only occurring with a downward, slight to moderate, slant. The slant often appeared accentuated by a fairly frequent occurrence of narrow palpebral openings, or, among many with a moderate opening, by a habit of keeping the eyelids half shut. A wide palpebral opening was uncommon.

The mongolian fold was not noted in the adults; it was common in the younger children.

Color of hair. The hair of all full- and probable full-bloods, with one exception, was completely straight. One female's hair was somewhat wavy at the ends, although straight on top of the head. Felt by the fingers, the hair seemed usually of medium texture; a greater tendency toward coarseness occurred in the females than in the males.

[10] Hrdlička, A. Anthropology of the Sioux. Am. J. Phys. Anthrop., XVI, 130, 1931.

[11] Loc. cit., 130.

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Grayness. No gray hair was noted in any full- or probable full-blood below 40 years of age. Among the males, the youngest full-blood showing some gray hairs was 45, probable full-blood, 40; females, full-blood, 40, probable full-blood, 50. Almost 57 per cent of the individuals between 40 and 55, inclusive, had no gray hair at all; this condition is close to the 50 per cent among the Sioux.[12] Many subjects above 55, even at the ages of 70 and 80, showed but few gray hairs, although several cases did occur of approximately two-thirds of the hair gray, as well as one instance of a blind man with practically an entire head of yellowish-gray hair.

The pattern of graying among the Indians, to the writer's knowledge, has not been commented upon. Among whites, even negroes, as recently pointed out by Boas and N. Michelson ('32, p. 215), graying of the hair commonly begins and is most extensive at the temporal regions and around the lower occiput. The writer was struck by the rarity of this gray-hair pattern in the full- and probable full-blood Comanches. Almost invariably the graying in the latter was 'general,' i.e., a condition where more or less widely separated strands of hair, apparently originating around the forehead, had become iron- or yellowish-gray. On the other hand, several instances of compact, temporal graying were noted among the mixed bloods. The 'general' type of graying seemed a distinctly full-blood Indian characteristic.

Loss of hair. No full-blood under 60, and none under 50 among the probable full-bloods, had any loss of hair whatever. Several of the older men had slight to moderate loss over the forehead; three old women likewise showed a slight loss over the forehead.

Moustache and beard. No moustache or beard whatever was noted in either full- or probable full-blood.

Eyebrows. The men often plucked out their eyebrows. Where present, in male or female, the amount of hair in the brow was usually thin, never over medium. A trace of concurrency occurred in 39 per cent of individuals with eyebrows not plucked.

[12] Hrdlička, A. Loc. cit., 132.

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142 *Forehead.* The forehead was usually of medium height by inspection; it was high in approximately 20 per cent of the males and 17 per cent of the females, and low, sometimes very low, in 13 per cent of the former, and 28 per cent of the latter. No (or a slight) slope backward of the forehead occurred in 42 per cent of males, 76 per cent of females; a moderate slope backward, 47 per cent males, 24 per cent females; and a marked slope was noted in approximately 11 per cent of the males.

Supraorbital ridges. The data on the supraorbital ridges of the full-bloods, given below, are self-explanatory. A somewhat greater percentage of marked ridges obtained in the probable full-bloods.

Supraorbital ridges: full-bloods

	Males Per cent	*Females* Per cent
None to slight	5.3	56.–
Moderate	57.9	28.–
Marked	36.8	16.–

An approach to concurrency of the ridges occurred in two males and six females. The ridges of the females, more frequently slight or moderate as they are, would be more likely to coalesce with the usual female slight to moderate glabella. Indeed, approximately three-quarters of the females had no (or a slight) glabella prominence, the remainder, with one exception of a marked bulge, showed moderate prominence. Approximately 14 per cent each of slight and marked glabella prominences occurred in the males.

The glabella appeared more frequently pronounced among the probable full-bloods.

The malars. Prominence of the malars in the males was: submedium 5.3 per cent, medium 36.8 per cent, prominent 57.9 per cent; among the females: 60 per cent medium, 40 per cent prominent. The malars were usually of good size, i.e., well filled out. This visual observation of a preponderance of prominent and heavy malars is attested to by the great average widths of the bizygomatic diameter.

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Nose. The depression of the root in the full-blood males was 142
'high' or practically not at all depressed in 31.6 per cent, shallow in 10.5 per cent, and medium in 57.9 per cent; the females showed a 'high' root in 4 per cent, a shallow depression in 40 per cent, and a medium depression in 56 per cent. No case of deeply depressed root was recorded.

Correspondingly, the width of the root was medium to wide in approximately one-fourth of the males and one-half of the females. The males therefore show a fairly narrow root of generally medium depth; the females, a somewhat wider root, of medium or shallow depth.

The root in the probable full-blood males was almost always of medium depth and from medium to narrow width.

Nasal profile. The details on the nasal profile are given below. A straight or slightly to moderately convex bridge appears to be the most common. The descriptive term 'wavy' indicates a greater or less prominence in the middle of the bridge, being straight above and below. Convexity was somewhat more common among the probable full-bloods.

Bridge of nose: full-bloods

	Males Per cent	Females Per cent
Straight (or nearly so)	52.6	68.–
Convex (slight to moderate)	36.8	20.–
'Wavy'	5.3	12.–
Concave (slightly)	5.3	....

Nasal septum. The septum was straight in 36.8 per cent of males, 44 per cent of females; it was inclined, slightly to moderately, downward from the face in 57.9 per cent of males, 32 per cent of females; a slight upward inclination occurred in 5.3 per cent of males, 24 per cent of females. The somewhat large percentage of upward inclination of the septum noted in the females does not signify a tilted nose, but merely a slight though perceptible slope of the septum proper.

Lips. Thick lips (as would be so considered in whites) occurred in 4 per cent of the females only; thin lips were noted in 15.8 per cent of males and 32 per cent of females; the lips

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142 of the remaining subjects were of medium thickness. The factor of age has probably influenced the distribution. Approximately four-fifths of each sex had no (or merely a trace of a) lip seam; the other fifth, excepting one female with a marked seam, showed a fairly perceptible seam. The male probable full-bloods showed a somewhat greater absence of the seam.

Teeth. Clearly discernible shovel-shaped upper incisors occurred in every full- and probable full-blood examined. Not infrequently, too, well-marked shovel-shaped incisors were found in mixed-bloods. Numerous cases of caries were noted, [164] although the impression remained that it is probably not as extensive, especially among the older people, as in whites or negroes.

Alveolar prognathism. Taking a perpendicular maxilla region as a standard, 57.9 per cent of males and 68 per cent of females had practically no alveolar prognathism; 36.8 per cent of the former and 28 per cent of the latter showed slight protrusion; and in 5.3 per cent of males and 4 per cent of females occurred medium prognathism. The 'no' and 'slight' categories would probably approximate the average in the whites.

Chin. The chin nearly always appeared firm or strong, generally round and of medium prominence. The gonial angles were often jutting.

The ear. The ear appeared large and well formed. The lobe was absent in 8 per cent of the subjects. Where present it was entirely attached to the face in 30 per cent, and separated from or pendant, in 62 per cent of the individuals. Large, medium, and small sized lobes were present in about equal frequency among the males, a somewhat larger proportions of small lobes in the females.

The helix showed a one-third roll in 62 and 76 per cent of the males and females, respectively; a two-thirds roll, 23 and 20 per cent, respectively; a complete roll 15 and 4 per cent. A trace of the Darwin's tubercle occurred in 18.2 per cent of both sexes.

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Miscellaneous. The body build of the Comanches is inclined to corpulency, perhaps even more today than in Catlin's time. The hands appeared small but well formed. Several instances were noted where the second toe of the foot was distinctly longer than the first or big toe.

The health of the Comanches seemed not particularly good. Trachoma is endemic, with actual blindness or badly impaired vision frequent. Rheumatism, venereal diseases, and tuberculosis were other common complaints.

Relative to mentality, Richardson ('27, p. 72) says, "the Comanches were not a dull people. In native ability their chiefs were a match for the keenest minds of the white men." Mooney appraises them as 'practical and businesslike.' Although the present writer's sojourn with the tribe was very brief, he can emphatically confirm the judgments of the aforementioned observers. Joking or bantering proclivities seemed also a widespread characteristic.

MEASUREMENTS[a]

Stature. The average stature of the Comanches, according to the writer's data, is 168.3 cm. for males and 156.1 cm. for females. These averages are quite close to those reported by Boas (1895 a, males 167.8 cm., females 156.2 cm.), being practically identical in the females. A significant likeness, too, appears in the gross distribution of the two series, namely, approximately one-fourth, respectively, being short (below 166 cm.), and tall (above 173 cm.).

	Males	
	Under 166 cm., per cent	Over 173 cm., per cent
Comanche		
Goldstein	29.4	23.5
Boas	24.4	27.1
Apache and Navaho (Boas, 1895 a)	23.7	25.3

[a] It may be mentioned that the percental distributions of the characters measured, not included here, were, despite the small numbers, as a rule of remarkably even spread, i.e., conforming to the normal distribution curve. The averages, minima and maxima of the various characters are appended at the end.

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141 Fairly close similarity of average statures is also noted
171 between the Comanche, Shoshoni, and Apache.

Stature

GROUP	MALES		FEMALES	
	Number of subjects	Stature	Number of subjects	Stature
		cm.		cm.
Comanche (Goldstein)	(17)	168.3	(25)	156.1
Shoshoni (Boas, 1899)	(42)	166.5	(21)	152.8
Apache (Hrdlička, '09)	(212)	169.1	(70)	156.8

Arm-spread. The mean excess of arm-spread over stature is rather large in the males, 7.7 cm. and 6.9 cm. for full- and probable full-bloods, respectively. The arms of the females are relatively, as well as absolutely, shorter, showing an average stature-span index of 102.2 as compared with the male 104.5. The arm-span was slightly less than stature in only two instances among the males, but was not infrequently in the females.

The Shoshoni[14] (Boas, 1899) approach very closely the Comanche in relative length of arms, giving indices of 104.3 and 103.3 for males and females, respectively. The Apache, on the other hand, apparently differ materially in this respect from the Comanche, yielding indices of 100.6 for each sex.

Height sitting. The Comanche stem length (males, 88.25 cm.) appears intermediate between the Apache (90.3 cm.) and the Shoshone (86.7 cm.). Relative to total height, the averages of 52.3 per cent in the males and 52.8 per cent in the females, are very close to the Shoshoneans (52.2 per cent and 52.7 per cent, respectively). The Apache males have relatively somewhat longer upper bodies (53.2 per cent of stature), but the females (52.8 per cent) are in this feature identical with the Comanches.

[14] Some measurements on males are available for the Shoshoni proper; others, including all the female data herein used, are available only for a combined group of Shoshonean bands (Boas, 1899); in the following, 'Shoshone' will refer to the latter.

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The sitting height of the probable full-bloods averages 89.58 cm., and this is 52.89 per cent of total height; absolutely and relatively, therefore, they have longer upper bodies than the full-bloods.

Head measurements. The head of the Comanche is free from artificial deformation. It is fairly long, but also quite broad. The vault, taken from the base of the biauricular line to bregma, is low, as low as that of the Apache. No data for this latter feature is available on the living Shoshone, although skull measurements indicate a low vault (Hrdlička, '27).[15]

Head dimensions

GROUP	NUMBER OF SUBJECTS	HEAD LENGTH	HEAD BREADTH	HEAD HEIGHTH
		Males		
		cm.	cm.	cm.
Comanche	(18)	19.17	16.03	13.47
Shoshoni	(43)	19.35	15.31	....
Apache	(148)	18.7	15.8	13.5
		Females		
Comanche	(25)	18.53	15.24	13.25
Shoshoni	(26)	18.43	14.62	....
Apache	(41)	17.5	15.5	13.0

Cephalic module. ($\frac{L. + B. + H.}{3}$) The cephalic module or mean diameter of the head, as seen below, shows the Comanche intermediate between the Apache and the Sioux. The female to male relationship in this feature is virtually alike in Comanche (96.0) and Sioux (96.7). The head of the Comanche is large; indeed, relative to stature, it is probably as large as that of any North American tribe.

[15] Dr. Truman Michelson's unpublished data on the Wind River Shoshoni confirm this.

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Head module and stature

GROUP	MALES				FEMALES			
	Module		Module × 1000 / Stature		Module		Module × 1000 / Stature	
	Number of subjects	Average	Number of subjects	Average	Number of subjects	Average	Number of subjects	Average
		cm.				cm.		
Comanche	(18)	16.22	(17)	96.4	(23)	15.67	(25)	100.4
Sioux (Hrdlička, 31 a)	(72)	16.40	(72)	94.8	(36)	15.86	(36)	99.7
Apache	(174)	16.00	(167)	94.0	(41)	15.35	(41)	97.9

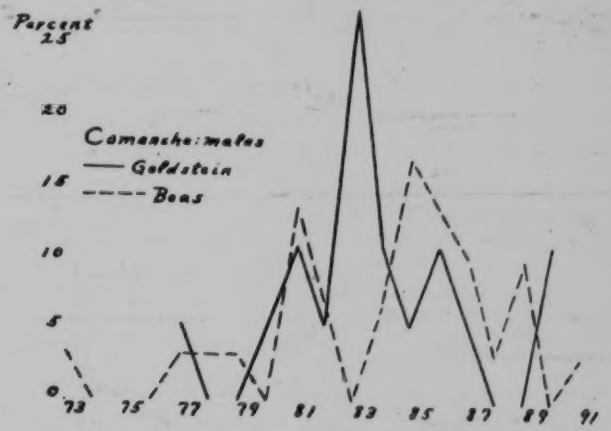

Fig. 1 Cephalic index.

Cephalic index. The form of the head of the full-blood Comanches ranges from meso- to strong brachycephaly, with an average index of 83.7 for males and 82.25 for females. The writer's average for the males is fairly close to that reported by Boas for the same sex (see below); no index for females was mentioned by the latter. More detailed comparison with Boas' data is presented graphically (fig. 1). In

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general outline the two series appear very similar. The curve /41 according to Boas' data, however, is flatter, suggesting greater /71 variability. A difference also exists in the modal or most frequent index, occurring at 85 in the Boas curve, and at 83 in the writer's.

This tendency toward a greater proportion of decided brachycephaly in the Boas series is likewise illustrated by the distributions below.

Comanche males

	Number of subjects	Average	Under 79 per cent	Over 84 per cent
Goldstein	(18)	83.7	5.6	33.3
Boas	(29)	84.6	10.2	65.3

Both series are small and this inadequacy of numbers probably accounts in a large measure for the difference in the distributions, although cognizance must also be taken of the possibility of the presence of some mixed blood in the Boas series.

Boas further gives a cranial index of 80.0 for fifteen Kiowa and Comanche combined skulls.

The Comanches, according to both Boas and the writer, are definitely brachycephalic, and in this important respect are quite different from the equally definitely mesocephalic Shoshoni.[16] The Apache, Caddo, Kiowa, and Navaho appear related to the Comanche in head form.

Cephalic index, males

GROUP	NUMBER OF SUBJECTS	CEPHALIC INDEX
Apache (Hrdlička, '08)	(148)	84.9
Comanche (Boas, 1895 a)	(29)	84.6
Comanche (Goldstein)	(18)	83.7
Navaho (Hrdlička, '31 b)	(28)	83.7
Caddo (Boas, 1895 a)	(36)	83.5
Kiowa (Boas, 1895 a)	(40)	82.0
Shoshoni	(43)	79.1

[16] See also T. Michelson. Note on Shoshoni Anthropometry. Proc. 23rd Internat. Cong. Americanists, N. Y., 1928, p. 856.

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141 171 *Height indices.* The height of the vault relative to length and breadth of the head is seen to be rather low in the males, but fairly high in the females. Relative to the mean of length and breadth of head, probably a more clear-cut index, the height in the males averages lower than that of the Apache, and is as low as that of the Sioux; the females again, however, show good height.

Head height indices

GROUP	MALES				FEMALES			
	Number of subjects	Height-length index	Height-breadth index	Mean[2] height index	Number of subjects	Height length index	Height-breadth index	Mean[2] height index
Old U. S. Whites[1]	?	70.0	89.5	79.2	?	71.0	89.5	79.7
Apache	(148)	72.1	84.9	78.3	(41)	74.6	84.1	78.8
Comanche	(18)	70.4	84.0	76.6	(25)	71.5	87.0	78.5
Sioux	(72)	68.1	86.3	76.1	(36)	68.6	84.7	75.8

[1] These and other figures following for the Old U. S. Whites are taken from Hrdlička's 'Old Americans' ('25) and from abstracts of the same data in his 'Anthropology of the Sioux' ('31).

[2] Height: length + breadth.

Dimensions of the face. The facial dimensions corroborate the impression of largeness obtained by inspection. The length below the forehead compares favorably with that of the Sioux, and exceeds this diameter in the Apache and Shoshoni; the total length is not so great, indicating a low forehead.

The breadth of the face is astonishingly large even for an Indian people; the Comanches in this respect are probably exceeded by few or no other tribes.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

Dimensions of the face

GROUP		MALES			FEMALES		
		Menton-nasion	Menton-crinion	Diameter bizygomatic maximum	Menton-nasion	Menton-crinion	Diameter bizygomatic maximum
Sioux	Number of subjects	?	?	?	?	?	?
	Average (cm.)	12.84	19.42	15.1	11.97	18.07	14.6
Comanche	Number of subjects	(18)	(14)	(19)	(25)	(24)	(25)
	Average (cm.)	12.67	18.71	15.44	11.98	17.76	14.68
Shoshoni	Number of subjects	(42)	....	(43)	(21)	....	(26)
	Average (cm.)	11.88	....	14.82	10.85	....	13.69
Apache	Number of subjects	(174)	....	(174)	(51)	....	(51)
	Average (cm.)	11.8	....	14.9	10.8	....	14.1
Indians of the Southwest and northern Mexico	Number of subjects	....	?	....	....	?	....
	Average (cm.)	....	18.46	....	....	17.23	....

Facial indices. Although absolutely long, the face below the forehead is relatively to the breadth only moderate, the males in this respect approaching the Indians of the Southwest and northern Mexico; the females in this feature are closest to the Sioux.

The physiognomic index is noteworthy for indicating great relative broadness.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

Facial indices

GROUP		MALES		FEMALES	
		Morphologic index	Physiognomic index	Morphologic index	Physiognomic index
Sioux	Number of subjects	?	?	?	?
	Average	85.1	77.4	81.9	80.8
Indians of the Southwest and northern Mexico	Number of subjects	?	?	?	?
	Average	82.2	77.7	82.1	78.7
Comanche	Number of subjects	(18)	(14)	(25)	(24)
	Average	82.1	82.1	81.6	82.6
Shoshoni	Number of subjects	(42)	....	(21)	....
	Average	80.1	....	79.2	....
Apache	Number of subjects	(174)	....	(51)	....
	Average	78.8	....	76.4	....

Height and breadth of forehead. The average height of forehead among the Comanches is very low, especially that of the males. This metrical lowness is in contrast to the more medium height noted by inspection.

The average minimal frontal diameter of the forehead is seen in both sexes to be almost like that of the Sioux. A rather unusually low variability occurred in this character among the males.

Forehead

GROUP		MALES		FEMALES	
		Height of forehead	Minimum frontal diameter	Height of forehead	Minimum frontal diameter
Indians of the Southwest and northern Mexico	Number of subjects	?	?	?	?
	Average (cm.)	6.66	10.41	6.12	10.17
Sioux	Number of subjects	?	?	?	?
	Average (cm.)	6.48	10.64	5.93	10.30
Comanche	Number of subjects	(14)	(19)	(24)	(25)
	Average (cm.)	6.05	10.69	5.71	10.29
Old U. S. Whites	Number of subjects	(148)	(247)	(207)	(210)
	Average (cm.)	6.58	10.59	6.45	10.12

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

Breadth of lower jaw. The gonio-frontal index is used by Hrdlička to indicate relative breadth of the lower jaw. The Comanches have a moderately wide mandible, much less developed in width than the Sioux, but in the males almost identical with the Indians of the Southwest and northern Mexico.

GROUP	MALES			FEMALES		
	Number of subjects	Bigonial diameter	Gonio-frontal index[1]	Number of subjects	Bigonial diameter	Gonio-frontal index[1]
		cm.			cm.	
Sioux	?	11.5	92.7	?	11.0	93.6
Comanches	(19)	11.08	96.48	(25)	10.66	96.51
Indians of the Southwest and northern Mexico	?	10.79	96.5	?	10.15	100.2
Old U. S. Whites	(247)	10.63	99.1	(210)	9.84	103.0

[1] Minimum frontal diameter × 100: bigonal diameter.

The nose. The nose of the Comanche appears unusually long, showing a greater average length than any of the compared peoples.

In breadth, too, the nose is generous, perceptibly exceeding the averages of the Sioux and the Indians of the Southwest and northern Mexico, but appearing practically like that of the Shoshoni.

Nose

GROUP	MALES				FEMALES			
	Number of subjects	Length	Breadth	Index	Number of subjects	Length	Breadth	Index
		cm.	cm.			cm.	cm.	
Shoshoni	(42)	5.27	4.30	81.6	(26)	4.95	4.01	85.1
Indians of the Southwest and northern Mexico	?	5.18	4.15	80.4	?	4.8	3.78	78.6
Sioux	?	5.94	4.18	70.4	?	5.45	4.04	74.1
Comanche	(19)	6.28	4.36	69.4	(25)	5.75	3.98	69.17
Old U. S. Whites	(247)	5.35	3.61	67.5	(210)	4.94	3.25	65.98

The resulting nasal index is leptorrhinic, which in this instance does not so much signify narrowness as unusual height.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

14/11 The apparently unusual height of the nose, combined with the previously indicated long lower face (nasion to chin), and seeming unusually low forehead, may suggest that the nasion was judged higher than the actual. The precise determination of nasion is admittedly difficult, and the possibility of a small constant error must be recognized. It may be mentioned, however, that a large number of photographs of Comanches were carefully scrutinized, according to which, in general, the nose did appear quite long, tending to confirm the metric data.

The mouth. The Comanches possess a moderately wide mouth, though a large face. The comparative data are self-explanatory.

Breadth of mouth

GROUP	NUMBER OF SUBJECTS	MALES	NUMBER OF SUBJECTS	FEMALES
		cm.		cm.
Sioux	?	6.30	?	6.16
Indians of the Southwest and northern Mexico	?	5.85	?	5.49
Comanche	(19)	5.76	(25)	5.69
Old U. S. Whites	(247)	5.37	(210)	4.95

The ear. Upon inspection the ear of the Comanches appeared strikingly long and rather narrow. The metric data indicate that both dimensions, especially in the males, are large, being distinctly greater than those of the Sioux, Shoshone, or Old U. S. Whites. The low index shows plainly the great relative length of the ear and explains the impression of narrowness notwithstanding good width.

Ear

GROUP	MALES				FEMALES			
	Number of subjects	Length	Breadth	Index	Number of subjects	Length	Breadth	Index
		cm.	cm.			cm.	cm.	
Comanches	(19)	7.63	3.99	52.38	(25)	7.08	3.66	51.75
Sioux	?	7.33	3.93	53.6	?	7.05	3.76	53.3
Old U. S. Whites	(247)	6.69	3.79	56.7	(210)	6.10	3.47	56.9
Shoshone	(45	6.52	....	....	(11)	6.10	....	....

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

The chest. The Comanches, although a shorter people than the Sioux, approach the latter in dimensions of the chest, especially in breadth. The average index indicates a relatively deep chest, but does not quite reach the splendid depth of the Sioux; it shows to greater advantage however than those of the Indians of the Southwest and northern Mexico or Old U. S. Whites.

Chest, males

GROUP	NUMBER OF SUBJECTS	BREADTH	DEPTH	INDEX
		cm.	cm.	
Sioux	?	31.92	26.0	81.4
Comanche	(16)	31.51	24.5	77.76
Indians of the Southwest and northern Mexico	?	29.9	22.8	76.15
Old U. S. Whites	(246)	29.76	21.7	72.93

Left hand. The metric data corroborates a visual observation, namely, the remarkably small hand of the Comanche. It is, however, well proportioned, giving a length-breadth index very similar to that of the Sioux and the Old U. S. Whites.

Left hand, males

GROUP	NUMBER OF SUBJECTS	LENGTH	BREADTH	INDEX
		cm.	cm.	
Comanche	(17)	17.91	8.51	47.52
Indians of the Southwest and northern Mexico	?	18.53	8.51	45.9
Old U. S. Whites	(247)	19.28	9.18	47.64
Sioux	?	19.83	9.43	47.6

The left foot. The foot of the males, according to the data below, shows nothing distinctive; in both dimensions and in the somewhat large relative breadth it resembles the foot of the Indians of the Southwest and northern Mexico.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

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Left foot, males

GROUP	NUMBER OF SUBJECTS	LENGTH	BREADTH	INDEX
		cm.	cm.	
Indians of the Southwest and northern Mexico	?	25.42	10.15	37.91
Comanches	(14)	25.99	10.05	38.68
Old U. S. Whites	(245)	26.12	9.45	36.33
Sioux	?	26.8	9.93	37.1

'PROBABLE' FULL-BLOODS

These individuals, it will be recalled, could not be as certainly diagnosed with respect to possible mixture as the full-bloods, and were therefore considered 'probably' full-blood.

The metric data clearly show tangible and fairly consistent differences between this group and the full-bloods, although the differences between the means of several important measurements and indices (stature, head height, cephalic index) were found to be statistically not significant;[17] the numbers concerned, however, are probably too small for statistical refinement. On the other hand, the writer could not conscientiously classify this group with the mixed-bloods, for, as seen below, they appear almost as divergent from the mixed- as from the full-bloods. If mixture of blood is present, it is probably not very recent, in so far as mixture in these individuals was apparently unknown to the members of the tribe and, according to their outward physical appearance, would seem to have been primarily with other Indian groups. Whether a larger series would materially affect the averages is, of course, problematical.

In short, the probable full-bloods appear to be an aberrant group, resembling in physiognomy and shape of head the Sioux, but in stature, and especially in high vault of head, approaching the Navaho.

[17] Difference between the means being less than four times $\sqrt{a^2 + b^2}$ where a and b equal the probable error of the first and second means, respectively.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

Comparison of full-, probable full- and mixed-blood males[1]

MEASUREMENT	FULL-BLOOD		PROBABLE FULL-BLOOD		MIXED-BLOOD	
	Number of subjects	Average	Number of subjects	Average	Number of subjects	Average
Stature	(17)	168.29	(15)	169.22	(23)	169.11
Sitting height index	(16)	52.3	(13)	52.89	(15)	52.17
Cephalic index	(18)	83.74	(16)	80.35	(23)	82.59
Head height	(18)	13.47	(16)	13.84	(24)	13.66
Head module	(18)	16.22	(16)	16.41	(24)	16.20
Mean height index	(18)	76.56	(16)	78.48	(23)	78.2
Face: Menton-nasion	(18)	12.67	(16)	12.46	(22)	12.59
Menton-erinion	(14)	18.71	(14)	18.74	(19)	18.42
Bizygomatic diameter	(19)	15.44	(16)	15.28	(22)	14.98
Index, morphologic	(18)	82.05	(16)	81.51	(22)	84.01
Index, physiognomic	(14)	82.05	(14)	81.97	(19)	81.14
Nose: Index	(19)	69.49	(16)	74.61	(22)	68.88

[1] All figures except indices are in centimeters.

DISCUSSION

The traditional close and friendly contact of the Comanche with the Shoshoni, each speaking the same language and apparently possessing no social barriers to free intermarriage, would seem to have made some miscegenation between the two peoples very likely. At the same time, however, any closer physical relationship than possible occasional intermarriage, seems doubtful, considering the fundamental difference of head form in the two groups—the Comanche definitely bracycephalic, the Shoshoni, and other Shoshonean tribes of the northern plateaux, definitely mesocephalic. The only Shoshonean groups similar to the Comanches in average stature and cephalic index are those of southern California (Boas, 1895 b). Even these, however, differ from the Comanches in the important character of shape and probably relatively greater breadth of the nose.[18]

The Comanches, in the light of their history, are undoubtedly a complex group physically; they are mixed to a greater or lesser extent probably with all the many and varied tribes

[18] "The nose is very often concave, rather short, but wide with thick alae." (Boas, 1895 b, p. 269.)

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Summary of Comanche measurements[1]

	FULL-BLOOD						PROBABLE FULL-BLOOD		
	Male			Female			Males		
	Number of subjects	Average	Range	Number of subjects	Average	Range	Number of subjects	Average	Range
Stature (Goldstein)	17	168.29	158.0 –177.0	25	156.1	145.5 –165.0	15	169.22	158.5 –180.5
(Boas)	74	167.8			156.2				
Arm-span minus stature	13	+7.7	+16.0 – –2.0	21	+4.4	+17.0 – –9.5	14	6.9	16.0 – 0.5
Span-stature index	13	104.5		21	102.2		14	104.0	
Height sitting	16	88.25	83.5 – 93.5	23	82.6	77.5 – 91.0	13	89.58	83.0 – 98.0
Height-sitting index	16	52.3	50.3 – 54.5	23	52.8	49.7 – 56.9	13	52.89	51.1 – 54.3
Head: length	18	19.17	17.7 – 20.3	25	18.53	17.6 – 19.6	16	19.62	18.6 – 20.5
breadth	19	16.03	15.3 – 17.1	25	15.24	14.4 – 16.0	16	15.76	14.4 – 16.8
height	18	13.47	12.8 – 14.6	25	13.25	12.3 – 14.2	16	13.84	12.5 – 15.2
module	18	16.22	15.27– 17.03	25	15.67	14.97– 16.30	16	16.41	15.37– 16.97
Module vs. stature	17	96.4	91.2 –106.3	25	100.4	95.8 –106.5	15	96.9	91.6 –102.3
Cephalic index (Goldstein)	18	83.74	76.9 – 90.4	25	82.25	75.8 – 89.9	16	80.35	72.7 – 88.4
(Boas)	29	84.6							
Height-length index	18	70.38	65.5 – 77.7	25	71.52	65.3 – 78.9	16	70.56	64.0 – 78.7
Height-breadth index	18	83.99	78.7 – 90.3	25	86.96	80.6 – 93.3	16	87.83	79.2 – 97.4
Mean height index	18	76.56	71.5 – 83.5	25	78.48	72.6 – 84.5	16	78.25	71.9 – 86.4
Face: menton-nasion	18	12.67	11.4 – 13.8	25	11.98	10.4 – 13.3	16	12.46	10.8 – 13.4
menton-erinion	14	18.71	16.7 – 19.9	24	17.76	16.0 – 18.6	14	18.74	16.8 – 20.6
Maximum bizygomatic diameter	19	15.44	13.9 – 16.4	25	14.68	14.0 – 15.2	16	15.28	14.0 – 16.4
Facial indices: morphologic	18	82.05	73.1 – 87.7	25	81.58	69.3 – 89.3	16	81.51	73.0 – 91.4
physiognomic	14	82.05	77.4 – 87.2	24	82.61	75.3 – 92.1	14	81.97	74.5 – 88.1
Forehead, height	14	6.05	4.8 – 7.2	24	5.71	4.0 – 7.1	14	6.36	5.9 – 7.5
Minimum frontal diameter	19	10.69	10.2 – 11.2	25	10.29	9.4 – 11.1	16	10.56	10.0 – 12.1
Bigonial diameter	19	11.08	9.6 – 12.4	25	10.66	10.1 – 11.5	16	11.19	9.5 – 12.1
Gonio-frontal index	19	96.48	85.4 –108.3	25	96.51	84.2 –105.9	16	94.36	85.0 –107.4
Nose: length	19	6.28	5.6 – 7.0	25	5.75	5.1 – 6.5	16	6.0	5.3 – 7.3
breadth	19	4.36	3.6 – 5.1	25	3.98	3.5 – 4.7	16	4.48	3.8 – 5.4
index	19	69.49	56.1 – 87.9	25	69.17	59.3 – 88.7	16	74.61	63.1 – 87.1
Mouth breadth	19	5.76	4.6 – 6.6	25	5.69	5.0 – 6.7	16	5.87	5.0 – 6.6
Left ear: length	19	7.63	6.6 – 8.8	25	7.08	6.2 – 7.8	16	7.56	6.7 – 8.5
breadth	19	3.99	3.2 – 4.9	25	3.66	3.3 – 4.0	16	3.89	3.4 – 4.2
index	19	52.38	45.5 – 67.1	25	51.75	44.2 – 59.4	16	51.45	42.0 – 60.0
Chest: width	16	31.51	26.8 – 36.0	23	30.25	26.8 – 34.2	16	32.56	28.9 – 38.3
depth	16	24.50	17.3 – 29.2	23	24.19	20.6 – 29.2	16	25.55	21.2 – 29.7
index	16	77.76	64.6 – 89.0	23	79.95	72.8 – 97.7	16	78.45	67.7 – 93.7
Left hand: length	17	17.91	15.9 – 19.9	25	17.6	15.6 – 19.0	16	18.53	16.8 – 21.3
breadth	17	8.51	6.8 – 10.0	25	8.54	6.5 – 9.5	16	9.18	7.5 – 9.9
index	17	47.52	40.5 – 52.8	25	48.54	41.7 – 51.8	16	49.53	42.9 – 53.8
Left foot: length	14	25.99	23.2 – 27.8	24	24.07	22.5 – 25.9	14	26.23	25.0 – 28.5
breadth	14	10.05	8.7 – 12.3	24	9.34	8.2 – 11.0	14	9.89	8.7 – 10.6
index	14	38.68	34.7 – 45.7	24	38.8	35.1 – 45.1	14	37.72	33.7 – 42.0

[1] All figures except indices are in centimeters.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

/4/ with which they came in contact in their vast nomadic range.
/7/ On the whole, excepting a suggestion of the Sioux in their physiognomy, and of the Shoshone in body proportions, the Comanches seem to the writer, in view of their medium to tall stature, clear brachycephaly, low vault of head, and large and heavy facial features, an essentially Apache-like people.

SUMMARY

The Comanches are of medium average stature, generally of robust physique, and possess relatively long arms.

Their head is absolutely and relatively to stature large; it is meso- to decidedly brachycephalic in shape, and very low in height.

The face is very broad and probably long below the forehead; the forehead seems very low in height, but is fairly broad in width. A broad but also long nose, moderately wide mouth, and moderately developed (in width) lower jaw, completes the physiognomy. The ears are large in both dimensions, also relatively long; the chest is wide and fairly deep; the hand usually small but well formed; the foot relatively somewhat broad.

In a number of the above features, particularly stature and shape and height of head, the Comanche appear essentially related to the Apache; their decided brachycephalic would seem to preclude close physical affinity with the linguistically related mesocephalic Shoshoni.

A group of so-called probable full-bloods appears as an aberrant type, chiefly in much lower brachycephaly and high vault of head. In taller stature and high vault of head they resemble the Navaho; in their other characters they tend to approach the Sioux.

4: Goldstein D-5 (ca. 1930)1934
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LITERATURE CITED

113 BOAS, F. 1895 a Zur Anthropologie der nordamerikanischen Indianer. Zeitschrift für Ethnologie, xxvii, 366–416.

———— 1895 b Anthropometric observations on the Mission Indians of southern California. Proc. Am. Assoc. Advancement of Sc., XLIV, 261–269.

———— 1899 Anthropometry of Shoshonean tribes. Am. Anthropologist, n. s., I, 751–758.

BOAS, F., AND NICHOLS MICHELSON 1932 Graying of hair. Am. J. Phys. Anthrop., XVII, 213–228.

BUREAU OF AMERICAN ETHNOLOGY 1907, 1910 Handbook of the American Indians north of Mexico. Bull. 30, Washington.

CATLIN, G. 1842 Illustrations of the manners, customs, and conditions of the North American Indians, II, 4th ed., London.

CHAVES, A. 1906 The defeat of the Comanche Indians in 1717. Hist. Soc. New Mex., Santa Fe.

CLARK, W. P. 1885 The Indian sign language. Philadelphia.

FARRAND, L. 1904 Basis of American history. The American Nation: a history, II, New York.

HRDLIČKA, A. 1908 Physiological and medical observations among the Indians of the southwest U. S. and northern Mexico. Bull. 34, Bur. Am. Ethnol., Washington.

———— 1909 The stature of the Indians of the Southwest and northern Mexico. Putnam anniv. vol., 405–426, New York.

———— 1920 Anthropometry. The Wistar Institute, Philadelphia.

———— 1925 The Old Americans. Baltimore.

———— 1927 Catalogue of human crania in the U. S. National Museum collections, no. 2, Washington.

———— 1931 a Anthropology of the Sioux. Am. J. Phys. Anthrop., XVI, 123–166.

———— 1931 b Catalogue of human crania in the U. S. National Museum collections, no. 4, Washington.

KROEBER, A. L. 1906–1907 Shoshonean dialects of California. U. Calif. Public. Am. Ethnol. and Archeol., IV.

MICHELSON, T. 1928 Note on Shoshoni Anthropometry. Twenty-third Internat. Cong. Americanists, 856.

MOONEY, J. 1898 Calendar history of the Kiowa. 17th Ann. Rept., Bur. Am. Ethnol., pt. 1, Washington.

———— 1928 The aboriginal population of America north of Mexico. Smithson. Miscel. Coll., LXXX.

REPORT OF COMMISSION OF INDIAN AFFAIRS 1932 Washington.

RICHARDSON, R. 1929 The culture of the Comanche Indians. Bull. Texas Archeol. and Paleontol. Soc., I, 58–72.

WISSLER, C. 1927 North American Indians of the Plains, New York.

4: Goldstein D-5 (ca. 1930)1934
NO6 Comanche NO6

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PLATES

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4: Goldstein D-5 (ca. 1930)1934
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Left—Toyo, 62 years old.

Right—Chief Millet, Kwahadi Band, 69 years old.

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4: Goldstein D-5 (ca. 1930)1934
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Left—Wilbur Pewo, 42 years old.

Right—Knox Tokawana, 48 years old.

4: Goldstein D-5 (ca. 1930)1934
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Left—Mrs. Peecher, Kotsoteka Band, 55 years old.

Right—Petarsy, 49 years old.

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